TABLE SHOWING THE MATERIAL AND THE 'INTELLECTUAL' RESOURCES OF UNIVERSITIES AND COLLEGES OF THE UNITED STATES IN 1902; AND THEIR INCREASE SINCE 1889–1890.

Material Resources, 1902.	Amount.	Ratio of Increase Since 1889–'90.	'Intellectual' Status, 1902.	Total Number.	Ratio of Increase Since 1889–'90.
Total value of property.	$417,205,234	2.83	Number of universities and colleges.	638	1.53
Value of grounds and buildings.	154,529,288	2.4	Number of students.	107,391	1.9
Endowment funds.	185,944,668	2.5	Post-graduate students.	4,942	2.47
Benefactions received during the year 1902.	17,039,967	2.8	Number of teachers.	15,945	2
Appropriation received from states, cities, etc.	6,437,493	4.5	Number of books and libraries.	8,784,307	2.1
Cost of buildings erected during the year 1902.	5,680,000 at least	2.8 at least			
Income exclusive of benefactions.	33,863,244	3.3			

result of our studies may be summarized in the accompanying table.

Inspection of this table will reveal the fact that in the interval between 1889–90 and 1902 the material resources of our colleges have become from 2.4 to 4.5 times as great as at the beginning of this period, while their 'intellectual' resources, measured by the increase in schools, students, teachers and books, have become only from 1.53 to 2.47 times as great as in 1890.

The progress of our colleges in the past twelve years has been material rather than intellectual.

It is not the purpose of this article altogether to decry this progress, for many conditions have rendered it for the time, at least, desirable or even necessary, but it must be checked erelong and the *intellectual* side, the soul of the college, developed in greater ratio.

College presidents and boards of trustees must realize that imposing buildings and expensively equipped laboratories will not make universities. I grant that in our country it is usually far easier to gather funds for the erection of buildings than for the development of unseen things, but this fact alone should be a stimulus to those to whom the destiny of our colleges is entrusted to seek even more ardently for aid in the adequate endowment of professorships, for funds required in the prosecution and publication of research, for the enlargement of learned libraries, and for all things pertaining to the intellectual life of the college. Men who give of their wealth to aid our colleges are usually actuated by unselfish motives, and would gratefully receive the advice of those in control of the destiny of education, to advance the highest even if unseen, rather than to create the spectacular and superficial.

ALFRED GOLDSBOROUGH MAYER.
MARINE BIOLOGICAL LABORATORY,
TORTUGAS, FLA.

SCIENTIFIC BOOKS.

The Vegetable Alkaloids. With particular reference to their chemical constitution. By Dr. AMÉ PICTET, Professor in the University of Geneva. From the second French edition. Rendered into English, revised and enlarged, with the author's sanction, by H. C. BIDDLE, Ph.D., Instructor in the University of California. New York, John Wiley & Sons; London, Chapman & Hall, Limited. 1904. 8vo. Pp. vii + 505. Cloth, $5.00.

The publication of the classical work on 'Die Pflanzenstoffe' by Dr. August Huse-

mann, in 1871, marked the beginning of monographic work on proximate plant constituents. This work was revised in 1882, but no subsequent revisions have been made, and no other work has been published to take its place, doubtless owing to the great labor involved in collaborating the extensive researches of the past twenty-five years. Even 'Die Rohstoffe des Pflanzenreiches' by Wiesner, the second edition of which appeared not long ago (1902), required the assistance of a dozen collaborators. In more recent years the tendency has been for authors to confine their attention to single groups of plant constituents, as for example, the study of the carbohydrates by Tollens; the ethereal oils, by Gildemeister and Hoffmann, etc. One of the earliest of these works was that of Pictet on the 'Chemical Constitution of the Vegetable Alkaloids,' and the present work by Dr. Biddle is not only an English translation, but a revision of Pictet's work.

It is almost a hundred years since Sertürner, an apothecary of Hanover, isolated the first basic organic substance, or alkaloid. He obtained from opium a body termed by him *morphium,* which he compared to ammonia. This subject, however, did not arouse any special interest until about 1817, and during the next twenty years a number of the most important vegetable alkaloids were discovered, including emetine, strychnine, caffeine, quinine, nicotine, conine, atropine, aconitine, etc. The complex nature of these alkaloids rendered their study difficult, until Liebig showed that they are merely ammonia bases in which a hydrogen atom is replaced by an organic radical. This view was later confirmed by the classical researches of Wurtz and Hofmann, which led, nearly fifty years after Sertürner's isolation of morphine, to the first synthesis of an organic base, viz., conine, by Ladenburg.

It was found that most of the vegetable alkaloids are derivatives of pyridine, a compound discovered by Anderson in 'Dippel's oil,' a product obtained by the dry distillation of bones. Not all the alkaloids, however, are related to pyridine, some, as caffeine and theobromine, being uric acid derivatives, as pointed out by E. Fischer, in 1883. Betaine, muscarine and some others are closely related to the amines of the fatty acids, while still others, as leucine and glutamine, belong to the asparagine group.

The fact that most of the alkaloids were found to be in the nature of pyridine bases led to the study of the constitution of these bases as found in coal tar. Under the leadership of Hofmann research in this particular field was followed with a great deal of enthusiasm, and to him belongs the credit of first establishing the constitution of an alkaloid, viz., conine, the chief alkaloid of poison hemlock, which later was prepared, as already stated, synthetically by Ladenburg.

At the present, not only on account of the scientific interest of the subject, but also because of the economic value of these products, a large number of investigators are devoting attention to the study of the chemistry of the alkaloids. The result is a voluminous literature, and it is fortunate for not only students of chemistry and phyto-chemistry, but others as well, that these results have been brought together in the volume at hand. The work is divided into two parts, the first dealing with the artificial bases closely related to the natural alkaloids, and the second with the chemical behavior of the alkaloids and the bearing of this on their chemical constitution. The book has been brought up to date in most instances, as seen by the incorporation of the brilliant investigations of Ladenburg, Merling and Willstätter on the synthesis of atropine, atropamine, belladonnine, inactive cocaine and tropacocaine; the recent investigations of Von Gerichten and Knorr on morphine and codeine; the studies of Gadamer as well as Dobbie and Lauder on corydaline; Willstätter and Fourneau's work on lupinine; Rauwerda's work on cytisine; and also the extensive studies on the alkaloids of jaborandi, tobacco, coffee, etc., by Jowett, Pinner, Pictet, Fischer and various other investigators. There are, however, a number of recent investigations, the results of which are not included, but which would enhance a work of this kind, as

that of Miller on the constitution of ephedrine; the researches of Paul and Cownley on the alkaloids of ipecac; and those of Fischer, Schlotterbeck and others on various alkaloids, which have been published in the past few years in the *Proceedings of the American Pharmaceutical Association*. The physiological properties given in connection with some of the alkaloids might well be omitted in a work of this kind, particularly as a few of them are not entirely accurate. The index would be more helpful if the plant names were included in all cases, in addition to the names of the alkaloids derived from them. An enlargement on the parts dealing with physical properties and important chemical tests would add to the value of the book and make it appreciated by a larger number.

HENRY KRAEMER.

SCIENTIFIC JOURNALS AND ARTICLES.

THE June number (volume 10, number 9) of the *Bulletin of the American Mathematical Society* contains: Report of the April Meeting of the Chicago Section of the Society, by T. F. Holgate; 'The Heine-Borel Theorem,' by Oswald Veblen; 'On Self-Dual Scrolls,' by C. H. Sisam; 'On Some Tendencies in Geometric Investigations,' by Corrado Segre; Reply to Professor Snyder's Review of Study's Geometrie der Dynamen, by Eduard Study, with Note by Virgil Snyder; 'Notes'; 'New Publications.'

The July number of the *Bulletin* contains: Report of the April Meeting of the Society, by F. N. Cole; Report of the April Meeting of the San Francisco Section, by G. A. Miller; 'On Linear Homogeneous Difference Equations and Continuous Groups,' by Saul Epsteen; Review of Warren's Experimental and Theoretical Course of Geometry, by R. E. Moritz; a number of 'Shorter Notices'; 'Notes'; 'New Publications'; 'Thirteenth Annual List of Published Papers'; Index of Volume 10.

A general index of the *Bulletin*, from 1891 to 1904, is in preparation.

The American Journal of Science for July contains the following articles:

H. A. BUMSTEAD: 'Atmospheric Radio-activity.'

T. HOLM: 'Studies in the Cyperaceæ.'

C. E. BEECHER: 'Note on a New Permian Xiphosuran from Kansas.'

C. BASKERVILLE and G. F. KUNZ: 'Kunzite and its Unique Properties.'

R. O. E. DAVIS: 'Analysis of Kunzite.'

E. H. KRAUS: 'Occurrence of Celestite near Syracuse, N. Y., etc.'

L. F. WARD: 'Famous Fossil Cycad.'

H. A. PERKINS: 'Comparison of Two Ways of Using the Galvanometer.'

H. E. MEDWAY: 'Further Work with the Rotating Cathode.'

H. L. BRONSON: 'Transverse Vibrations of Helical Springs.'

D. B. STERRETT: 'New Type of Calcite from the Joplin Mining District.'

J. TROWBRIDGE and W. ROLLINS: 'Radium and the Electron Theory.'

J. P. ROWE: 'Pseudomorphs and Crystal Cavities.'

SOCIETIES AND ACADEMIES.

THE TORREY BOTANICAL CLUB.

THE club met in the morphological laboratory at the New York Botanical Garden, March 30, 1904.

The first paper on the scientific program was 'Notes on the Cytology of the Aquatic Fungi,' by Dr. Cyrus A. King. Schroeter's classification of the Phycomycetes was reviewed and attention called to the fact that the conidia of the Peronosporineæ resemble sporangia since they germinate by forming internal zoospores. In the Saprolegniaceæ, according to Trow, the eggs are at first multinucleate, all except the sexual nucleus in each egg being disposed of by digestion. Dr. King's researches have shown that in the Leptomitaceæ, as far as known, the oogonia are at first multinucleate and the supernumerary nuclei are disposed of by migrating to the periphery of the cell where they are cut off in a distinct periplasm. In *Araiospora* the peripheral nuclei surround themselves with cell walls in such a way that the ooplasm is surrounded by a layer of periplasmic cells. In *Sapromyces* there is also a periplasm in which the nonsexual nuclei are cut off; it is, however, reduced to a very thin layer. The formation of a body in the center of the egg